Spacelabs Medical
An OSI Systems Company

Ambulatory Blood Pressure Report Generator

90239A

Operations Manual

070-0399-03 Rev. F

more time to care

CORPORATE OFFICES

U.S.A.

Spacelabs Medical, Inc.
5150 220th Ave SE
Issaquah, WA 98029
Telephone: 425-657-7200
Telephone: 800-522-7025
Fax: 425-657-7212

Authorized EC Representative
UNITED KINGDOM

Spacelabs Limited
71 Great North Road, Hatfield
Herts AL9 5EN
Telephone: 44-1707-263-570
Fax: 44-1707-260-065

CAUTION:

Rx
Only

US Federal law restricts the devices documented herein to sale by, or on the order of, a physician.

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Overview

Report Generator

The 90239A Ambulatory Blood Pressure (ABP) Report Generator works in conjunction with a Spacelabs Medical ABP monitor (90207, 90217). It receives patient data collected by the monitor, processes that data, and prints it out in graphical and/or tabular formats on either its small, built-in printer or an optional external printer.

The report generator can be configured by the user with a simple-to-use menu system. You can step through the entire menu and change every setting, or you can quickly access just those parameters that you want to alter. The menu items are self-explanatory, requiring you simply to enter a numeric value.

The report generator software can be upgraded with a ROM card that fits into a card slot below the control panel. Contact your sales representative for details.

Data Card Option

The Data Card option (P/N 040-0549-00) permits multiple blood pressure reports to be stored to and printed from a data card that inserts into the card slot under the control panel (refer to *Figure 1-1*, item ❹).

When you connect the serial port on the report generator to a serial port on a PC running 90219-02 or 90219-03 ABP Analysis software (version 4.00.00 or later), the report generator becomes a data card reader. Patient data can then be transferred from the data card to the computer's memory and printed.

External Printer Option

90239A Report Generators with software versions 1.13.04 and later can print reports and messages on an external printer connected to the 25-pin connector located on the back panel (refer to *Figure 1-2*, item ❸). This configuration requires use of a parallel printer cable and, if the Data Card option is used, a data key must be installed between the 90239A rear panel connector and the printer cable. (Refer to *Figure 1-5*.)
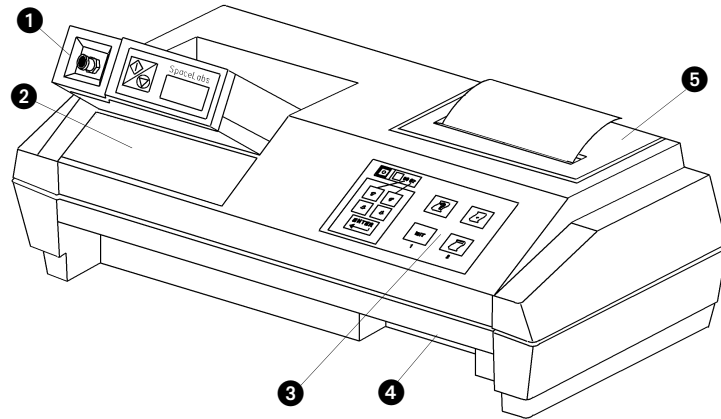
Figure 1-1: 90239A ABP Report Generator

❶ ABP monitor placed in chute of 90239A Report Generator for data transfer
❷ Label providing definitions for menu items
❸ User control panel
❹ Card slot for Data Card option
❺ Removable plastic cover to access printer paper

Figure 1-2: 90239A rear view

❶ Input connector for power adapter, 9 VDC, 800 mA
(110 V: P/N 655-0636-00; 230 V: P/N 119-0125-00)

❷ Serial port for connection to a PC containing 90219-02 or 90219-03 ABP Analysis software

❸ Data key and data key/external printer port

Attaching a data key to this connector enables the data card option and adds menu items for printing report summaries and selecting patient data for printing.

Control Panel Keys

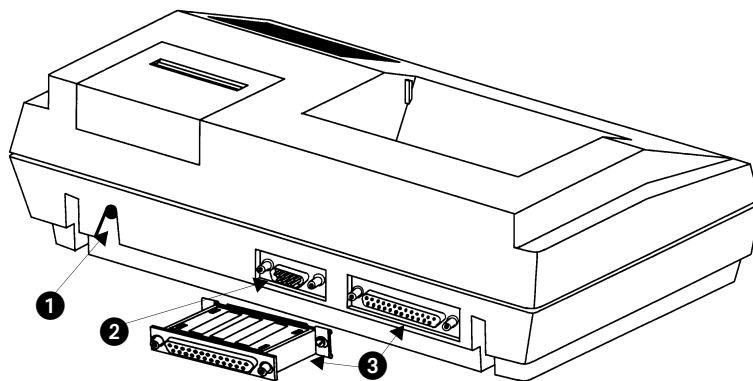The control panel keys are functionally divided into a group of five keys on the left and a group of four keys on the right (refer to *Figure 1-3*).

Note:
> *The ABP monitor must be switched ON and placed in the report generator's chute before most control panel keys will function. Otherwise, an error message will print.*
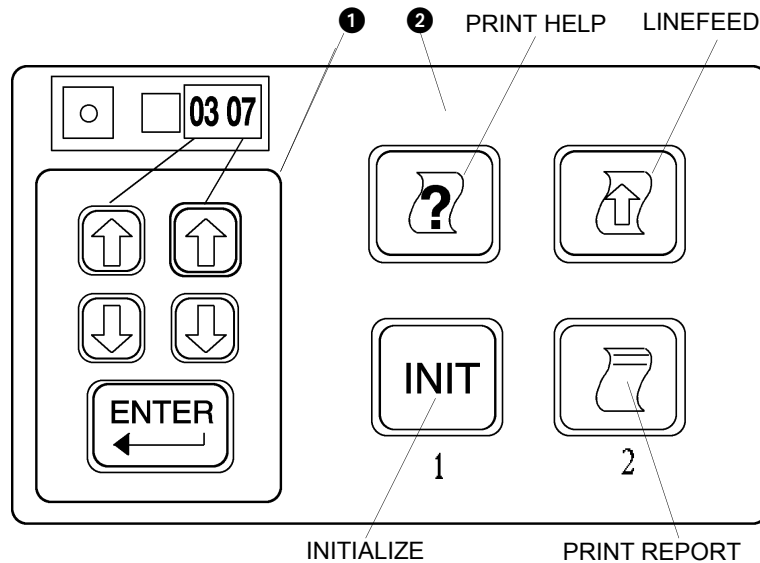

Figure 1-3: Control panel keys

❶ The five keys on the left provide printing and menu configuring functions. Refer to *Printing the Configuration Menu* on page 1-8 and *Configuration Menu Setup* on page 1-6 for details.

❷ The four keys on the right are as follows: PRINT HELP, LINEFEED, INITIALIZE, AND PRINT REPORT.

PRINT HELP

Press this key once to print brief definitions of the four keys on the right. When printing is complete, press it again to print brief definitions of the five keys on the left. This key also prints specified menu items (refer to *Changing Menu Configurations* on page 1-8). Press this key during printing to abort printing the key definitions.

LINEFEED

This key feeds one line of paper and moves the print head across the print area each time it is pushed. This is the only key that is functional when an ABP monitor is not in the chute. If the paper jams while printing, clear the jam and then press this key to clear the error from memory and to stop the ABP monitor from beeping. (Beeping indicates an error condition.)

INITIALIZE

Press this key to erase any patient data stored in the ABP monitor and to load current ABP monitor settings from the menu (refer to *Initializing the ABP Monitor* on page 1-9).

PRINT REPORT

Press this key to print a patient data report. Press it again during printing to abort the print process (refer to *Printing Patient Data* on page 1-10 for more information). With the Data Card option installed, this key copies patient data from the ABP monitor onto a data card inserted into the card slot rather than printing the report on paper. Remove the data card to physically print a report.

Setup

Paper Loading and Clearing (Internal Printer)

Caution

Use only Spacelabs Medical thermal paper in the printer (P/N 006-0210-02). The print mechanism may be permanently damaged if other brands of paper are used.

1 Ensure that the print head is positioned at the far left. If not, apply electrical power to the report generator. The print head will now make one or more passes across the print area. When it holds its position against the left side for several seconds, disconnect electrical power.

2 Remove the plastic cover over the cradle for the thermal paper and orient the roll so that the paper feeds from the bottom. Fold the left corner back so that the right corner forms a point (*Figure 1-4*).
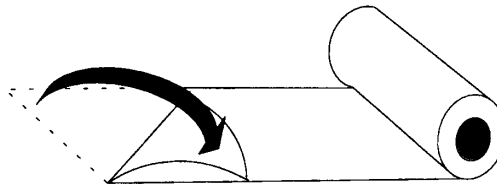

Figure 1-4: Loading the paper

3 Feed the point of the thermal paper through the slot in the bottom of the paper roll cradle until the point emerges up in the print area. Use tweezers to help pull the paper through until the entire fold clears the print head.

4 Thread the point through the slot in the plastic cover for the paper cradle and replace the plastic cover. This cover MUST be in place during printing.

Note:
If an external printer is used, consult its operator's manual for paper loading instructions.

External Printer Configuration

Beginning with software version 1.13.04, the 90239A can print reports and messages on an external printer connected to the 25-pin connector located on the back of the report generator. This configuration requires use of a centronics parallel printer cable and, if the Data Card option is used, a data key installed between the 90239A rear panel connector and printer cable. Refer to *Figure 1-5* below.
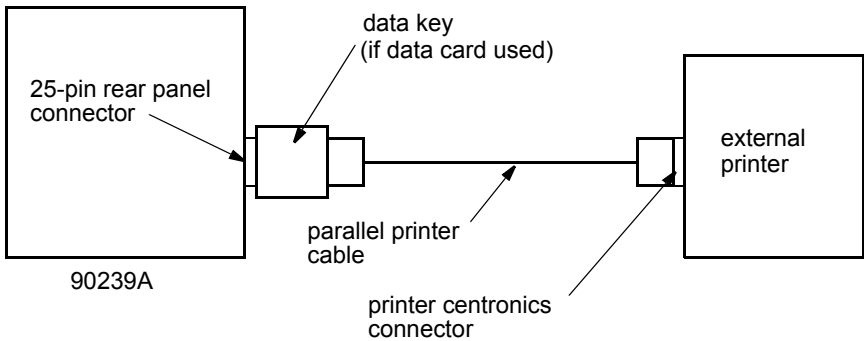

Figure 1-5: External printer configuration

Either of these two printers can be used:

- Okidata Microline 320 (or 100% compatible)
- IBM ProPrinter (or 100% compatible)

Two additional menu items now appear on the 90239A to support use of an external printer.

Menu Item	Selections Available	Description
37	00	Messages printed on *internal* printer.
	01	Messages printed on *external* printer.
38	01	An *Okidata* is connected to the 90239A.
	02	An *IBM ProPrinter* is connected to the 90239A.

Configuration Menu Setup

The report generator's configuration menu allows you to define certain modes of its operation according to individual requirements. Each menu item is identified on a front panel label (refer to *Figure 1-1*, item ❷). To select a menu item, press the left UP or DOWN arrow key on the report generator control panel until the desired two-digit menu item appears as the left pair of digits in the ABP monitor display.

The right pair of digits on the monitor display reflects the current setting for the menu item; press the right UP or DOWN arrow key on the control panel to display the desired value, then press ENTER to select that value.

Note:
*When a YES or NO response is required, **00 = NO** and **01 = YES**.*

Menu Functions

Item #	Function (for software versions 1.17.00 or later)	Default
01	Press ENTER to print a description of all menu items and their current settings.	---
02	Specify start of waking hours.	06:00
03	Specify start of sleeping hours.	23:00
04	Specify time interval between each measurement during waking hours.	20 minutes
05	Is a tone to sound 5 seconds before each programmed reading taken during waking hours (yes or no)?	Yes
06	Specify the time interval between each measurement during sleeping hours.	60 minutes
07	Is a reading to be displayed on the monitor after each measurement (yes or no)?	Yes
08	Is cuff pressure to be displayed during each measurement (yes or no)?	Yes
09	Specify how time is to be displayed (A.M./P.M. or 24-hour format) on the monitor.	24
10-14	Specify current hour, minute, year, month, and day, respectively.	---
15	Specify the maximum allowable cuff pressure (displayed on monitor as value divided by 10).	290
16	Are summary tables to be printed on report (yes or no)?	Yes
17	Are raw data tables to be printed on report (yes or no)? Refer to *Sample Printouts* on page 1-13.	Yes
18	Are hourly average blood pressure graphs to be printed on report (yes or no)? Refer to *Sample Printouts* on page 1-13.	Yes
19	Are raw blood pressure data graphs to be printed on reports (yes or no)? Refer to *Sample Printouts* on page 1-13.	Yes
20	Are heart rate graphs to be printed on reports (yes or no)? Refer to *Sample Printouts* on page 1-13.	Yes

Item #	Function (for software versions 1.17.00 or later)	Default
21	Specify the waking hours systolic statistical boundary used to compute the statistical summaries (displayed as value minus 100).	140
22	Specify the waking hours diastolic statistical boundary used to compute the statistical summaries.	90
23	Specify the sleep hours systolic statistical boundary (displayed on monitor as value minus 100).	120
24	Specify the sleep hours diastolic statistical boundary.	80
25	Are readings that violate the auto edit limits to be removed (yes or no)?	Yes
26	Specify the auto edit limit for maximum systolic (displayed on monitor as value divided by 10).	260
27	Specify the auto edit limit for minimum systolic (displayed on monitor as value divided by 10).	70
28	Specify the auto edit limit for maximum diastolic (displayed on monitor as value divided by 10).	150
29	Specify the auto edit limit for minimum diastolic (displayed on monitor as value divided by 10).	40
30	Specify the auto edit limit for maximum pulse pressure (displayed on monitor as value divided by 10).	150
31	Specify the auto edit limit for minimum pulse pressure (displayed on the monitor as value divided by 10).	20
32	Specify the auto edit limit for maximum heart rate (displayed on monitor as value divided by 10).	200
33	Specify the auto edit limit for minimum heart rate (displayed on monitor as value divided by 10). Default: 40	40
34	Specify the language (1 = English, 2 = French, 3 = German, 4 = Italian, 5 = Spanish).	---
35	Should graphs be automatically scaled to match data values (yes or no)?	Yes
36	Press ENTER to reset all menu items to factory default settings.	---
37	Should messages be printed on an external printer (yes or no)?	No
38	Specify the external printer type (01 = Okidata, 02 = IBM).	01
39	Press ENTER to print a summary of the reports stored on the data card. (Optional Data Card must be installed.)	---
40	Select item value 00 and press ENTER to print a list of currently queued reports. (Optional Data Card must be installed.)	---
41	Press ENTER to format the Data Card. (Optional Data Card must be installed.)	---

Report Generator

Changing Menu Configurations

1 Turn the ABP monitor power ON and place it in the report generator chute. Press the left UP or DOWN arrow key until the desired menu item number is displayed on the monitor. (To print the menu item and its current setting, press the PRINT HELP key.)

2 Press the right UP or DOWN arrow key until the desired value is displayed on the right side of the ABP monitor. When a YES or NO response is required, 00 = NO and 01 = YES.

3 Press ENTER.

Menu Configuration Example

Menu item 02 allows you to specify the time the patient normally wakes up. Assume that you want to change this wake-up time from the current setting of 06:00 (meaning 6:00 A.M.) to 08:00.

1 Ensure that the ABP monitor power switch is ON and that the monitor is placed in the report generator chute. Connect the report generator to external power.

2 After the ABP monitor shows a steady "0000," press the left UP arrow key on the report generator control panel until "0206" appears (where 02 is the menu item and 06 represents 6:00 A.M.).

3 Press the right UP arrow key on the control panel until "08" is displayed in the right half of the ABP monitor (the new value will start flashing). If you hold the arrow key down, you will see that the numbers scroll to 23 (denoting 11:00 P.M.) and then start over at 00. (The menu is always in a 24-hour format.)

4 Press ENTER to change the waking hour to the displayed value. The new value will stop flashing when it has been saved to memory.

Note:
The ABP monitor will continue to use the previous wake-up setting of 6:00 A.M. if the ENTER key is not pressed.

Printing the Configuration Menu

A printout of current menu settings is useful when configuring the report generator. To print a copy of this menu:

1 Ensure that the ABP monitor has fresh batteries installed and the report generator has paper loaded and is connected to external power.

2 Power ON the ABP monitor.

3 A four-digit number will be displayed on the ABP monitor, and then a time value will appear with a flashing colon (you can later set the correct time from the menu).

4 Place the ABP monitor in the chute. It will display "9999" and then quickly run through a series of numbers. The display will then show a steady "0000."

5 Press the left UP arrow key once. The ABP monitor should now display "0100." If the display shows anything other than 0100, press the left UP or DOWN arrow key until the ABP monitor displays 0100.

6 Press ENTER. The report generator will now print out the full menu along with the current settings (if this is the first time to print the menu, it will reflect factory default settings). This process takes several minutes.

Keep this menu printout for future reference.

Report Generator Operation

Initializing the ABP Monitor

Initializing the ABP monitor erases all stored patient data and loads any new monitor-related menu changes.

To initialize the ABP monitor:

1 Turn the ABP monitor power switch ON and place the monitor in the report generator chute. Menu changes can now be made (refer to *Configuration Menu Setup* on page 1-6).

2 Press the INIT key.

The paper automatically advances one linefeed, and the report generator indicates a successful initialization by printing a "Ready for use" message.

If you try to initialize the ABP monitor before its stored data has been printed or stored to a data card, the report generator prints the message "Monitor contains unprocessed data. This data will be lost if initialization continues!" When this happens, either:

• Press the INIT key again to continue initialization (the unprinted data will be erased);

   -OR-

• Press ENTER to abort the initialization process. In this case, the report generator prints "Monitor initialization aborted."

Copying ABP Monitor Data to a Data Card

To copy patient data from an ABP monitor to a data card (optional):

1 Insert a data card into the card slot on the front of the ABP Report Generator (refer to *Figure 1-1*, item ❹). Ensure that the data key is also connected to the back of the report generator.

Note:
   If either the data card or data key is not installed, patient data will print out on the report generator instead of being copied to the data card.

2 Power ON the ABP monitor and place the monitor in the report generator chute.

3 Wait until the ABP monitor display reads "0000," then press the PRINT REPORT key. The report generator will print "Reading monitor." The patient report will now be copied to the data card and receive the next sequential number.

Note:
   To abort copying the data to the data card, press the PRINT REPORT key a second time.

To erase patient data in the ABP monitor, refer to <i Italic>Initializing the ABP Monitor above.

Printing Patient Data

Note:

When a red stripe appears on the print paper, it indicates that 5 to 8 feet (1.3m to 2.4m) of paper remain on the roll. Do not start printing a report when this stripe appears. The report generator will attempt to continue printing even after it has run out of paper. Cut or tear off the paper from the roll. Pull the paper strip remaining in the print unit out in the same direction as normal paper movement and then load a fresh roll of paper.

Patient data can be printed either directly from the ABP monitor or from a data card. Patient data prints in the order shown below (graphs and/or tables may not print, depending on your menu selections):

1 Patient demographic header and technical data.

2 Data summary tables (total, daytime, and nighttime).

3 Hourly average data table (one table for each 24 hours).

4 Hourly average pressure graph (one graph for each 24 hours).

5 Hourly average heart rate graph (one graph for each 24 hours).

6 Raw data table (one table for each 24 hours).

7 Edited data table (one table for each 24 hours).

8 Raw data pressure graph (one graph for each 24 hours).

9 Raw data heart rate graph (one graph for each 24 hours).

Data that was obtained when the patient manually started a reading via the ABP monitor's START/STOP switch will be tagged with an "m" (for manual reading).

Data that was obtained on a second try after the ABP monitor failed to obtain a valid reading the first time will be tagged with an "r" (for retry).

Data that was obtained at pre-programmed times via menu settings will be untagged.

To Print Patient Data from the ABP Monitor

1 Power ON the ABP monitor and place the monitor in the report generator chute.

2 Wait until the ABP monitor display reads "0000," then press the PRINT REPORT key. The report generator will print "Reading monitor."

Note:

If the ABP monitor contains no data, the message "Monitor contains no readings" prints.

3 The patient data report will now print in accordance with the current menu settings on the report generator.

Note:

To abort printing, press the PRINT REPORT key a second time.

The ABP monitor retains patient data until it is initialized (refer to *Initializing the ABP Monitor* on page 1-9).

To Print Patient Reports from a Data Card

1 Insert the data card into the report generator card slot.

2 Each patient report that is copied onto a data card is numbered sequentially. This number is used to select each report for printing. If the sequential number of the report to be printed is already known, move ahead to step 3. If not, use the left UP or DOWN arrow key to select menu item 39, and then press ENTER. This prints a list of the patient reports on the data card along with their sequential numbers.

3 Select menu item 40 and use the right UP or DOWN arrow key to select the sequential number of the first patient data report to be printed. Press ENTER to transfer this number to the print queue, which is a list of the patient data reports to be printed. Additional patient data reports can be added to the print queue by selecting their numbers and pressing ENTER.

4 To verify the report numbers in the print queue prior to printing, use the left UP or DOWN arrow key to select menu item 40, then use the right UP or DOWN arrow key to select 00. Press ENTER to print a list of all report numbers that are in the queue ready for printing.

5 To print all the patient reports in the print queue, press the PRINT REPORT key.

Note:
To abort printing a patient report, press the PRINT REPORT key a second time.

Printing and Copying a Patient Report

To print a patient report prior to copying it to a data card:

1 Press the PRINT REPORT key without inserting the data card.

2 After the data has been printed, insert the data card into the card slot (the data key must also be connected), and then press the PRINT REPORT key.

Reverse steps 1 and 2 if patient data is to be copied to a data card first and then printed.

Correcting Printer Paper Problems

The ABP monitor beeps continuously if an error occurs during printing, such as torn paper in the print area or the paper not feeding freely through the paper-feed mechanism. To clear the problem, cut off the paper roll and pull the remaining paper strip in the direction of normal paper movement. Reload fresh paper and press the LINEFEED key on the control panel to clear the error from memory.

Caution

Do NOT pull the paper backwards through the printer. Reversing the normal direction of paper flow may permanently damage the paper-feed mechanism. Pull the remaining paper out only in the direction indicated in *Figure 1-6*.
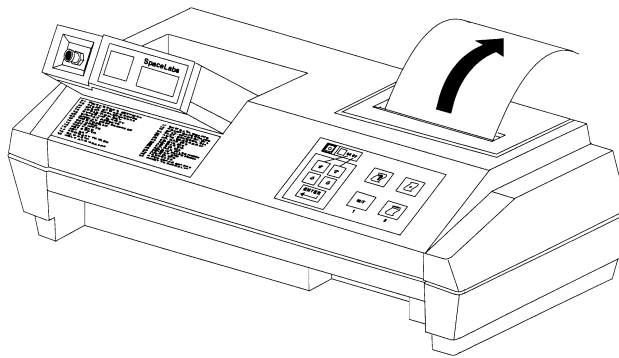
Figure 1-6: Clearing paper jams

Routine Maintenance

The following maintenance activities should be done on an as-needed basis:

- Wipe all external surfaces with a damp cloth. Ensure that no dust, lint, etc., obstructs the infrared window in the bottom of the chute.
- Remove the printer cover and vacuum out accumulated dirt and paper fiber from the print head area. Use tweezers to remove any paper scraps.

Performance Verification

Report Generator

The report generator performs a self-test each time it is connected to power. Following a successful self-test, the following information is printed:

- model name (ABP Report Generator)
- software version (for the report generator)
- year of copyright
- software version (for the ABP monitor)
- current date and time (programmable via the menu)

ABP Monitor

The ABP monitor performs a self-test each time its power switch is turned ON. Following a successful self-test, the monitor displays its software version number (0209 or a similar value) and then displays the current time. If the ABP monitor is inserted into the chute of the report generator at this time, it flashes a series of numbers and then displays "0000."

Note:
If the ABP monitor maintains a display of "9999," the report generator is not powered ON.

An unsuccessful self-test will display "EC25," indicating that the ABP monitor's software program has been corrupted. Place the ABP monitor in the chute, and the report generator will reload the software program. When the reloading process is complete, the ABP monitor will display "0000" and the report generator prints the message "Monitor software successfully installed in monitor."

Note:
- *Event Code (EC) numbers are defined in the 90207, 90217 Ambulatory Blood Pressure Monitors Operations Manual (P/N 070-0137-xx).*

Sample Printouts

The following pages show examples of internal and external printouts.

Note:
For explanations of Event Code (EC) numbers, refer to the 90207, 90217 Ambulatory Blood Pressure Monitors Operations Manual (P/N 070-0137-xx).

Internal Printer Samples
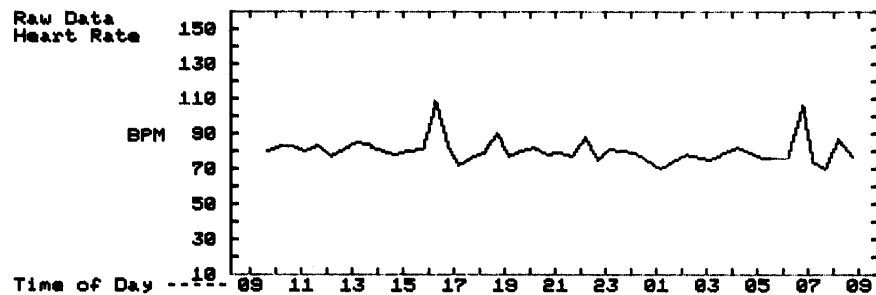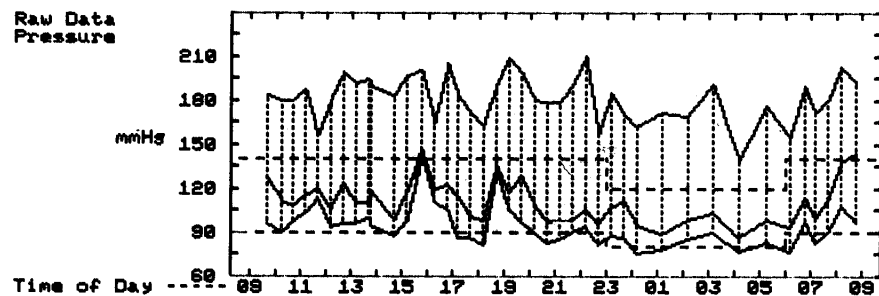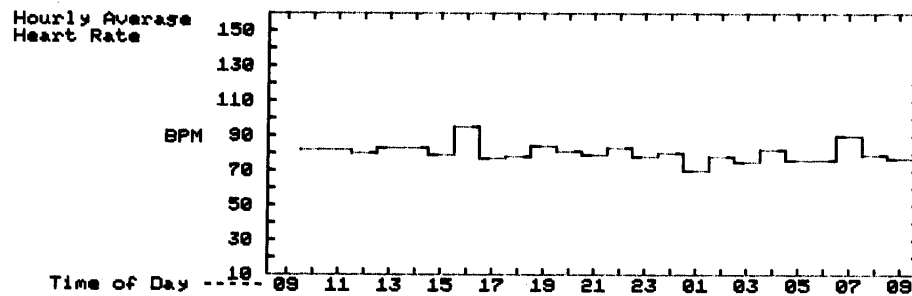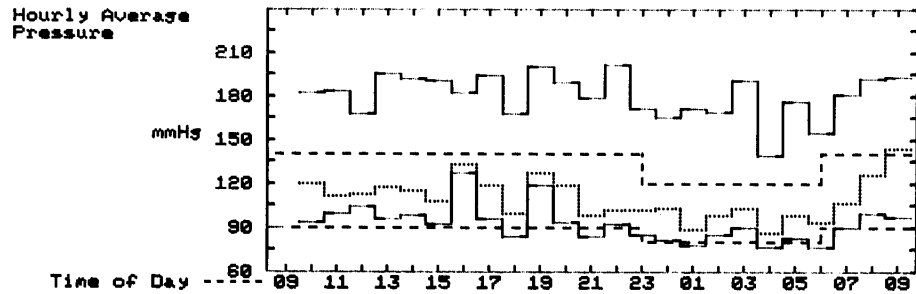
Internal Printer Samples (continued)

```
      Ambulatory Blood
      Pressure Report
       Copyright (c)
      1991-1993, 1994
   SpaceLabs Medical, Inc.


Date:     23-Feb-94


Patient Name:


..........................................................


Physician Name:


..........................................................




Monitor Initialized:

    Date:     17-Jun-93
    Time:       06:29


Monitor Read:

    Date:     23-Feb-94
    Time:       11:32


ABP Scan Began:

    Date:     17-Jun-93
    Time:       09:42


ABP Scan Ended:

    Date:     18-Jun-93
    Time:       08:45


Total time (hours):    24
Number of Readings:    41
Percent Successful:    95%
```

```
             Summary

  (mmHg)      Min Mean  Max
Systolic      139  180  210
Diastolic      75   92  142
MAP            86  109  146
Heart Rate     70   80  108

Above stat boundaries -
Systolic      100%
Diastolic      61%

Highest Sys   210 mmHg 22:12
Highest Dia   142 mmHg 15:45
Lowest Sys    139 mmHg 04:12
Lowest Dia     75 mmHg 00:12
```

```
         Daytime Summary
          6:00 - 22:59

  (mmHg)      Min Mean  Max
Systolic      155  185  210
Diastolic      77   96  142
MAP            94  114  146
Heart Rate     70   81  108

Systolic  >   140 mmHg   100%
Diastolic >    90 mmHg    61%

Highest Sys   210 mmHg 22:12
Highest Dia   142 mmHg 15:45
Lowest Sys    155 mmHg 06:12
Lowest Dia     77 mmHg 06:12
```

```
        Nighttime Summary
         23:00 -  5:59

  (mmHg)      Min Mean  Max
Systolic      139  169  191
Diastolic      75   82   90
MAP            86   97  111
Heart Rate     70   77   82

Systolic  >   120 mmHg   100%
Diastolic >    80 mmHg    63%

Highest Sys   191 mmHg 03:12
Highest Dia    90 mmHg 03:12
Lowest Sys    139 mmHg 04:12
Lowest Dia     75 mmHg 00:12
```

```
         Hourly Average

Hr #RD Sys Dia MAP Pul  HR

09  0   0   0   0   0    0
10  2 182  93 120  89   82
11  2 184 100 112  84   82
12  2 168 104 113  65   80
13  2 196  96 117 100   83
14  2 192  98 115  95   83
15  2 191  92 108  99   79
16  2 182 127 133  55   95
17  2 194  96 119  98   77
18  2 168  84 100  84   78
19  2 200 119 127  82   84
20  2 190  94 119  96   81
21  2 179  84  98  95   79
22  2 201  92 102 109   83
23  2 171  85 102  86   78
00  2 166  81 103  86   80
01  1 171  78  89  93   70
02  1 169  85  98  84   78
03  1 191  90 103 101   75
04  1 139  77  86  62   82
05  1 176  83  98  93   76
06  1 155  77  94  78   76
07  2 181  90 107  91   90
08  2 192  99 126  93   79
09  1 193  97 144  96   77
```

```
          Reading Data

RD
 #   Time Sys Dia Map  HR

  3  09:42 183  96 127  80
 5r  10:15 180  90 112  83
  6  10:42 180  97 108  83
  7  11:12 187 103 115  80
  8  11:42 156 113 120  83
  9  12:12 180  94 106  77
 10  12:42 199  96 123  81
 11  13:12 192  96 110  85
 12  13:42 194 100 110  84
13m  13:47 190  95 119  82
 15  14:42 184  87  98  78
 16  15:12 197  97 117  80
18r  15:45 200 142 146  81
20r  16:16 164 112 119 108
22r  16:45 205 106 122  82
 23  17:12 183  86 115  72
 24  17:42 172  86 101  76
 25  18:12 163  81  98  79
 26  18:42 191 132 136  90
 27  19:12 209 105 118  77
 28  19:42 199  97 128  80
 29  20:12 180  90 109  82
 30  20:42 179  83  97  78
 31  21:12 179  85  98  79
 32  21:42 191  90  98  77
 33  22:12 210  94 106  88
 34  22:42 157  82  96  75
 35  23:12 185  88 107  81
 36  23:42 170  86 111  80
 37  00:12 162  75  95  79
 38  01:12 171  78  89  70
 39  02:12 169  85  98  78
 40  03:12 191  90 103  75
 41  04:12 139  77  86  82
43r  05:14 176  83  98  76
 44  06:12 155  77  94  76
46r  06:44 190  97 114 106
 47  07:12 172  83 100  74
 48  07:42 180  90 113  70
 49  08:12 203 108 138  87
51r  08:45 193  97 144  77

m = Manually Initiated
r = Automatic Retry
<> = Estimated
```

```
           Edited Data

RD                         E
 #   Time Sys Dia Map  HR S

  1  09:12        EC =  21 E
 2r 09:14        EC =  21 E
  4  10:12        EC =  30 E
 14  14:12 188 172 185 185 A
 17  15:42        EC =  38 E
 19  16:12        EC =  40 E
 21  16:42        EC =  21 E
 42  05:12        EC =  21 E
 45  06:42        EC =  21 E
 50  08:42        EC =  40 E

A = Auto Edit
E = Event Edit
m = Manually Initiated
r = Automatic Retry
<> = Estimated
```

External Printer Samples

Ambulatory Blood Pressure Report

Date: 14-Feb-94

Patient Name: _____

Physician Name: _____

Technical Data

Monitor Initialized:	Date: 17-Jun-89	Time: 06:29
Monitor Read:	Date: 14-Feb-94	Time: 16:02
ABP Scan Began:	Date: 17-Jun-89	Time: 09:42
ABP Scan Ended:	Date: 18-Jun-89	Time: 08:45

Total time (hours):   24
Number of Readings: 41
Percent Successful: 91%

Summary

	Min	Mean	Max	
Systolic	139	180	210	mmHg
Diastolic	75	92	142	mmHg
MAP	86	109	146	mmHg
Heart Rate	70	80	108	BPM

Above stat boundaries -
Systolic   100%
Diastolic   61%

Highest Sys	210 mmHg	22:12
Highest Dia	142 mmHg	15:45
Lowest Sys	139 mmHg	04:12
Lowest Dia	75 mmHg	00:12

External Printer Samples (continued)

Daytime Summary 6:00 - 22:59

	Min	Mean	Max	
Systolic	155	185	210	mmHg
Diastolic	77	96	142	mmHg
MAP	94	114	146	mmHg
Heart Rate	70	81	108	BPM

Systolic > 140 mmHg 100%
Diastolic >   90 mmHg   61%

Highest Sys	210 mmHg	22:12
Highest Dia	142 mmHg	15:45
Lowest Sys	155 mmHg	06:12
Lowest Dia	77 mmHg	06:12

Nighttime Summary 23:00 - 5:59

	Min	Mean	Max	
Systolic	139	169	191	mmHg
Diastolic	75	82	90	mmHg
MAP	86	97	111	mmHg
Heart Rate	70	77	82	BPM

Systolic > 120 mmHg 100%
Diastolic >   80 mmHg   63%

Highest Sys	191 mmHg	03:12
Highest Dia	90 mmHg	03:12
Lowest Sys	139 mmHg	04:12
Lowest Dia	75 mmHg	00:12

Report Generator

External Printer Samples (continued)

Hourly Average

Hr	≠RD	Sys	Dia	MAP	Pul	HR
09:00	0	0	0	0	0	0
10:00	2	182	93	120	89	82
11:00	2	184	100	112	84	82
12:00	2	168	104	113	65	80
13:00	2	196	96	117	100	83
14:00	2	192	98	115	95	83
15:00	2	191	92	108	99	79
16:00	2	182	127	133	55	95
17:00	2	194	96	119	98	77
18:00	2	168	84	100	84	78
19:00	2	200	119	127	82	84
20:00	2	190	94	119	96	81
21:00	2	179	84	98	95	79
22:00	2	201	92	102	109	83
23:00	2	171	85	102	86	78
00:00	2	166	81	103	86	80
01:00	1	171	78	89	93	70
02:00	1	169	85	98	84	78
03:00	1	191	90	103	101	75
04:00	1	139	77	86	62	82
05:00	1	176	83	98	93	76
06:00	1	155	77	94	78	76
07:00	2	181	90	107	91	90
08:00	2	192	99	126	93	79
09:00	1	193	97	144	96	77

Hourly Average
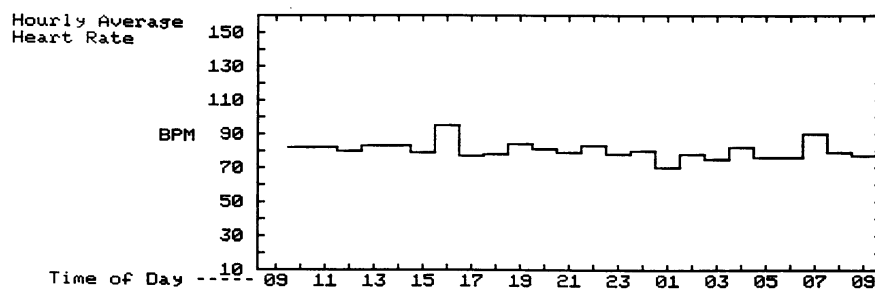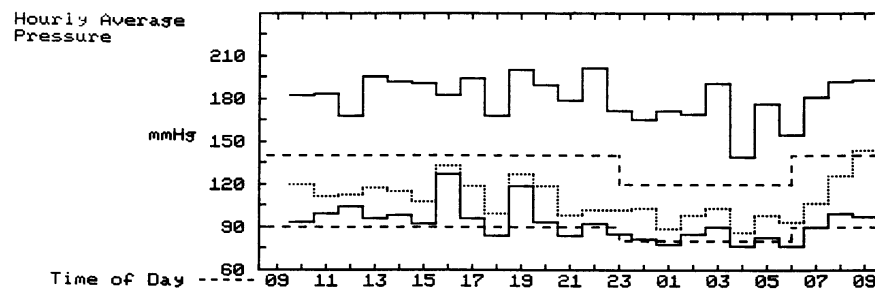
External Printer Samples (continued)

Reading Data

RD #		Time	Sys	Dia	MAP	HR
3		09:42	183	96	127	80
5	r	10:15	180	90	112	83
6		10:42	180	97	108	83
7		11:12	<187>	103	115	80
8		11:42	156	113	<120>	83
9		12:12	180	< 94>	106	77
10		12:42	199	96	123	81
11		13:12	192	96	110	85
12		13:42	194	100	110	84
13	m	13:47	190	95	119	82
17		14:42	184	87	98	78
18		15:12	197	97	117	80
20	r	15:45	200	142	146	81
22	r	16:16	164	112	119	108
24	r	16:45	205	106	122	82
25		17:12	183	86	115	72
26		17:42	172	86	101	76
27		18:12	163	81	98	79
28		18:42	191	132	136	90
29		19:12	209	105	118	77
30		19:42	199	97	128	80
31		20:12	180	90	109	82
32		20:42	179	83	97	78
33		21:12	179	85	98	79
34		21:42	191	90	98	77
35		22:12	210	94	106	88
36		22:42	157	82	96	75
37		23:12	185	88	107	81
38		23:42	170	86	111	80
39		00:12	162	75	95	79
40		01:12	171	78	89	70
41		02:12	169	85	98	78
42		03:12	191	90	103	75
43		04:12	139	77	86	82
45	r	05:14	176	83	98	76
46		06:12	155	77	94	76
48	r	06:44	190	97	114	106
49		07:12	172	83	100	74
50		07:42	180	90	113	70
51		08:12	203	108	138	87
53	r	08:45	193	97	144	77

m = Manually Initiated r = Automatic Retry
<> = Estimated

External Printer Samples (continued)

Edited Data

RD #	Time	Sys	Dia	MAP		HR	ES
1	09:12			EC	=	21	E
2 r	09:14			EC	=	21	E
4	10:12			EC	=	30	E
14	14:12	<188>	172	185		185	A
15	14:22	188	172	<185>		185	A
16	14:32	188	<172>	185		185	A
19	15:42			EC	=	38	E
21	16:12			EC	=	40	E
23	16:42			EC	=	21	E
44	05:12			EC	=	21	E
47	06:42			EC	=	21	E
52	08:42			EC	=	40	E

```
A = Auto Edit E = Event Edit
m = Manually Initiated r = Automatic Retry
<> = Estimated
```
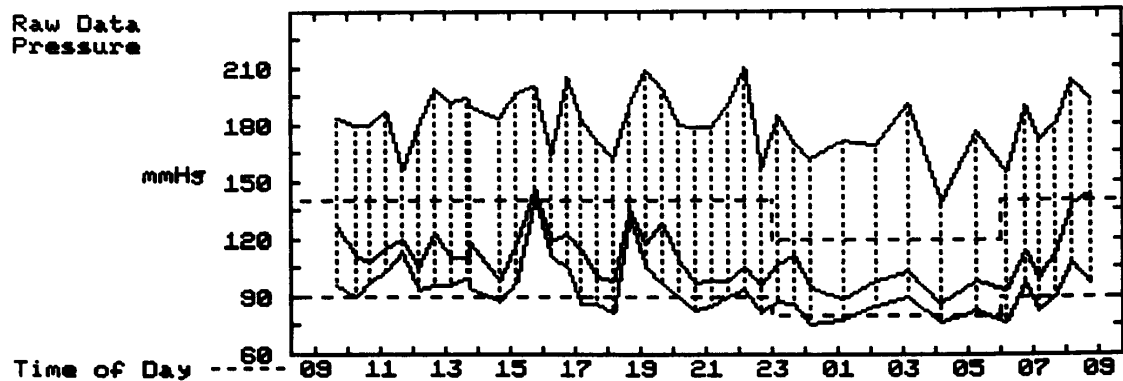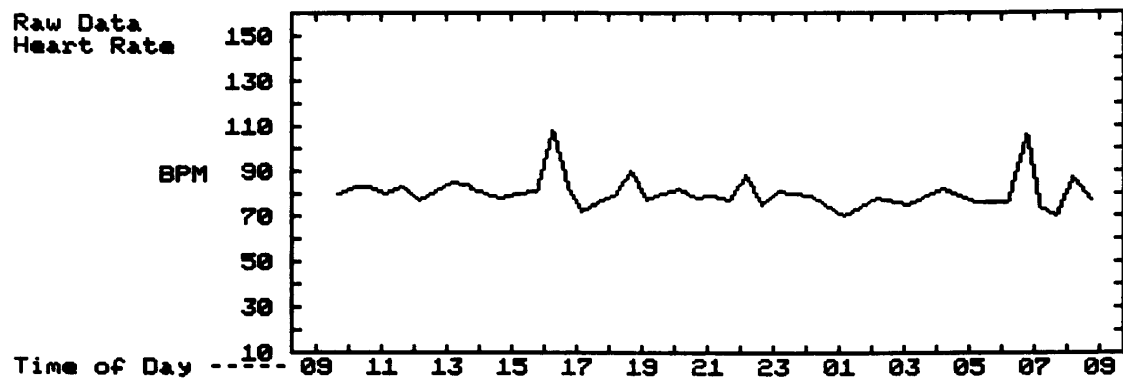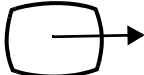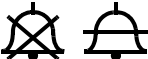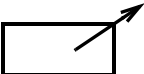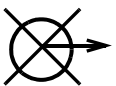
Symbols

The following list of international and safety symbols describes all symbols used on Spacelabs Medical products. No one product contains every symbol.
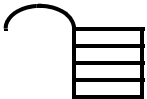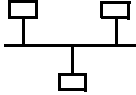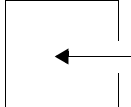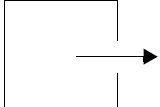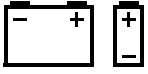
Symbol	Description	Symbol	Description
HELP	HELP Key		Keyboard Connection
SPECIAL FUNCTIONS	SPECIAL FUNCTIONS Key		Mouse connection
RECORD	RECORD Key		START/STOP Key
NORMAL SCREEN	NORMAL SCREEN Key		START/STOP
MONITOR SETUP	MONITOR SETUP Key		STOP or CANCEL Key
TONE RESET	ALARMS Key		CONTINUE Key
PREVIOUS MENU	PREVIOUS MENU Key		ENTER Key
	ON — Power Connection to Mains		OFF — Power Disconnection from Mains
	ON Position for Push Button Power Switch		OFF Position for Push Button Power Switch
	On Direction		ON/OFF
	Television; Video Display		Video Output
	ON — Part of the Instrument Only		OFF — Part of the Instrument Only
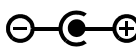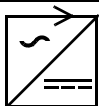
Symbol	Description	Symbol	Description
	Stand-by		STAND-BY Key
	PAUSE or INTERRUPT		Slow Run
	Reset		Power Indicator LED
	Alarm		Temporary Shut Off of Alarm Tone or Screen Indicators
	Indicator — Remote Control		Indicator — Local Control
	PRINT REPORT Key		Indicator — Out of Paper
	Partial ON/OFF		Recorder Paper
	Normal Screen		Return to Prior Menu
	Clock/Time Setting Key		TREND/TIMER Key
	HELP (Explain Prior Screen) Key		Keypad
	Activate Recorder for Graphics		Indoor Use Only
	START (NIBP) Key		Auto Mode (NIBP)
	Output		No Output (Terminated)
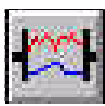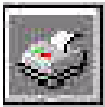
Symbols

Symbol	Description	Symbol	Description
	Data Input/Output		Input/Output
	Input		Reset
	Menu Keys		Waveform/Parameter Keys
	Monitor Setup Select Program Options		Set Initial Conditions Menu
	Access Special Function Menu		Return Unit to Monitor Mode
	Serial Port 1		Serial Port 2
	External marker push button connection		SDLC Port
	Arterial Pulse		Electrocardiograph or Defibrillator Synchronization
	Gas Exhaust		Foot Switch
	Enlarge, Zoom		Delete
	PCMCIA Card		Event
	Keep Dry		Fragile; handle with care
	Environmental Shipping/Storage Altitude Limitations		This Way Up
	Environmental Shipping/Storage Temperature Limitations		Environmental Shipping/Storage Humidity Limitations

Symbol	Description	Symbol	Description
	Open Padlock		Closed Padlock
	Down Arrow		Up Arrow
	Hard Drive		Power Indicator LED
	Antenna		Mermaid Connector
	Microphone		Omnidirectional Microphone
	Audio Output, Speaker		Activate Telemetry Recorder
	Network Connection		Universal Serial Bus
	Gas Sampling Port		Gas Return Port
	Remote Alarm; Nurse Alert		Nurse Call
	Battery Status		Low Battery
	Battery Replace only with the appropriate battery.		Replace only with the appropriate battery. (+ / - signs may be reversed)
	All batteries should be disposed of properly to protect the environment. Lithium batteries should be fully discharged before disposal. Batteries such as lead-acid (Pb) and nickel-cadmium (Ni-Cd) must be recycled. Please follow your internal procedures and or local (provincial) laws regarding disposal or recycling.		Caution - hazardous voltages. To reduce risk of electric shock, do not remove the cover or back. Refer servicing to a qualified service personnel (U.S.A.). DANGER - High Voltage (International)

Symbols

Symbol	Description	Symbol	Description
	Protective Earth Ground		Functional Earth Ground
	Replace Fuse Only as Marked		Fuse
	Power supply jack polarity. (+ / - signs may be reversed)		Equipotentiality Terminal
	Alternating Current		Direct Current
	Both Direct and Alternating Current		AC/DC Input
A	Amperes	Hz	Hertz
V	Volts	W	Watts
	IEC 601-1 Type B equipment. The unit displaying this symbol contains an adequate degree of protection against electric shock.		Class II Equipment
	IEC 601-1 Type BF equipment which is defibrillator-proof. The unit displaying this symbol contains an F-type isolated (floating) patient-applied part which contains an adequate degree of protection against electric shock, and is defibrillator-proof.		IEC 601-1 Type BF equipment. The unit displaying this symbol contains an F-type isolated (floating) patient-applied part providing an adequate degree of protection against electric shock.
	IEC 601-1 Type CF equipment. The unit displaying this symbol contains an F-type isolated (floating) patient-applied part providing a high degree of protection against electric shock, and is defibrillator-proof.		IEC 601-1 Type CF equipment. The unit displaying this symbol contains an F-type isolated (floating) patient-applied part providing a high degree of protection against electric shock.
	Loop Filter		Adult NIBP

Symbol	Description	Symbol	Description
	ETL Laboratory Approved		Canadian Standards Association Approved
	Risk of Explosion if Used in the Presence of Flammable Anesthetics		Operates on Non-Harmonized Radio Frequencies in Europe
Note	Note		Attention - Consult Operations or Service Manual for Description
WARNING	Warning About Potential Danger to Human Beings	**CAUTION**	Caution About Potential Danger to a Device
	Noninvasive Blood Pressure (NIBP), Neonate		Fetal Monitor Connection (Analog)
	Fetal Monitor Connection RS232 (Digital)		Physiological Monitor Connection RS232 (Digital)
	Happy Face		Sad Face
	Magnifying Glass		Compression
	File Cabinet		List of Rooms
	Arrows		Printer
	Recycle		Service Message
	Radio transmitting device; elevated levels of non-ionizing radiation		

Abbreviations used as symbols are shown below.

Symbol	Description	Symbol	Description
1 - 32	Access Codes 1 Through 32	**AIR**	Air
ANT 1 **ANT 2**	Diversity Antenna System 1 Diversity Antenna System 2	**Arr1** **ArrNet2**	Arrhythmia Net 1 Arrhythmia Net 2
CH **ch**	EEG, EMG, or ECG Channel EEG Channels - CH1, CH2, CH3, CH4 EMG Channel - CH5	**cmH$_2$O**	Centimeters of Water
C.O. **CO** **co**	Cardiac Output	**DIA** **dia**	Diastolic
ECG **ecg**	Electrocardiogram	**EEG** **eeg**	Electroencephalogram
EMG **emg**	Electromyogram	**ESIS**	Electrosurgical Interference Suppression
EXT	External	**FECG**	Fetal Electrocardiogram
FHR1 **FHR2**	Fetal Heart Rate, Channel 1 Fetal Heart Rate, Channel 2	**GND** **gnd**	Patient Isolated Ground
HLO **hlo**	High-Level Output	**Multiview**	Multi-Lead Electrocardiogram
NIBP **nibp**	Noninvasive Blood Pressure	**N$_2$O**	Nitrous Oxide
O$_2$	Oxygen	**PRESS** **press** **PRS**	Pressure
RESP **resp**	Respiration	**SDLC**	Synchronous Data Link Control
SPO2 **SpO2** **SpO$_2$** **SaO$_2$**	Arterial Oxygen Saturation as Measured by Pulse Oximetry	**SVO2** **S$\underline{v}$O2** **SvO$_2$**	Mixed Venous Oxygen Saturation

Symbol	Description	Symbol	Description
SYS **sys**	Systolic	**T1** **T2** **T3** **T4**	Temperature 1 Temperature 2 Temperature 3 Temperature 4
TEMP **temp**	Temperature	**UA**	Uterine Activity or Umbilical Artery
VAC	Vacuum Connection		